

Name: _____

Date: _____

Exam: Function Reflections (practice version 0)

1. Let function f be defined by the polynomial below:

$$f(x) = -9x^4 - 5x^3 - 8x^2 + 4x + 7$$

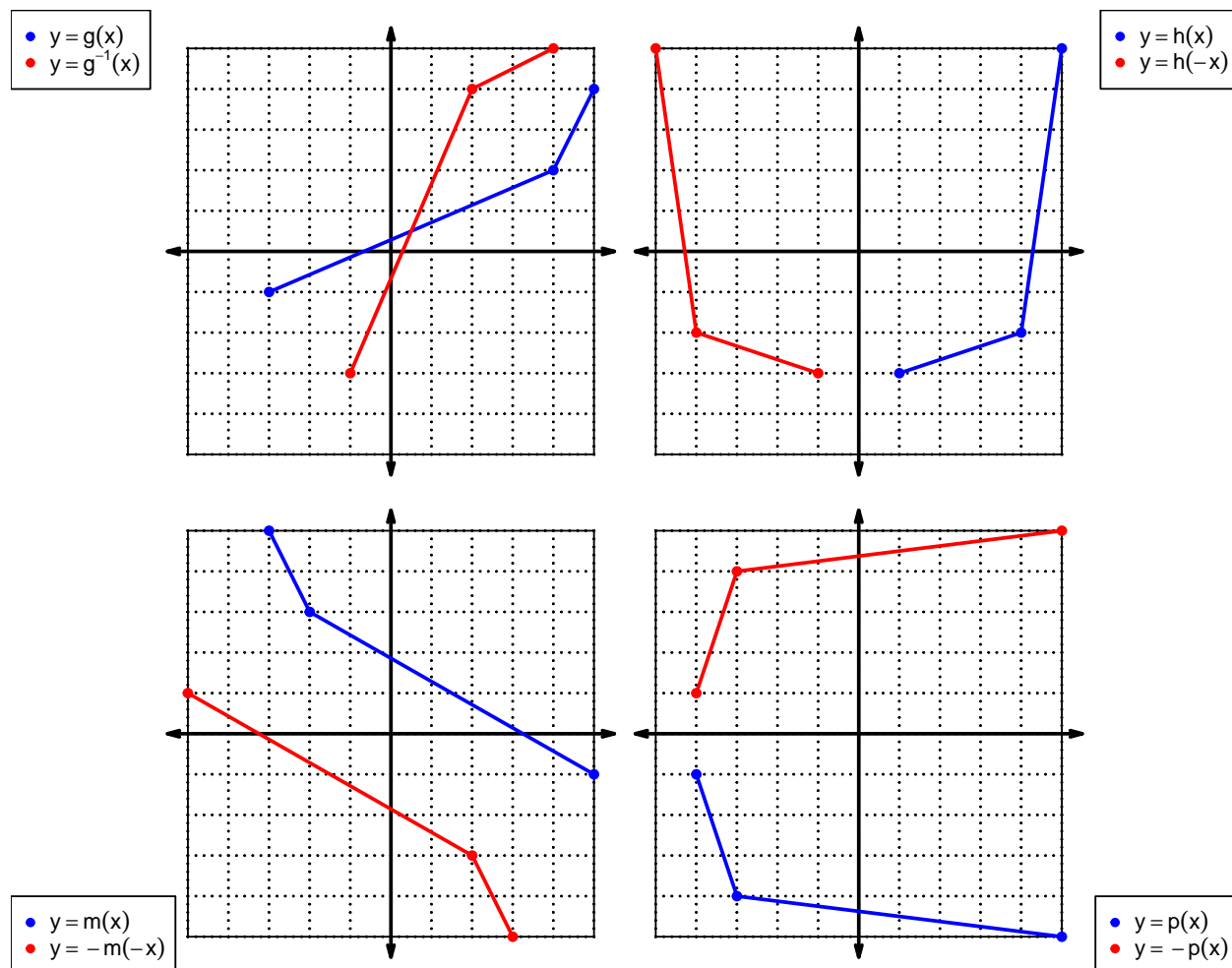
Draw lines that match each function reflection with its polynomial:

Reflections

Polynomials

$f(-x)$	•	•	$9x^4 + 5x^3 + 8x^2 - 4x - 7$
$-f(-x)$	•	•	$-9x^4 + 5x^3 - 8x^2 - 4x + 7$
$-f(x)$	•	•	$9x^4 - 5x^3 + 8x^2 + 4x - 7$

2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f , g , and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	2	3	4
2	6	4	8
3	9	2	5
4	5	9	7
5	7	6	3
6	3	7	1
7	1	8	2
8	4	5	6
9	8	1	9

3. Evaluate $f(6)$.

$$f(6) = 3$$

4. Evaluate $h^{-1}(7)$.

$$h^{-1}(7) = 4$$

5. By filling more rows of the table, it is possible to make function h **even**. If that were done, what would be the value of $h(-8)$?

If function h is even, then

$$h(-8) = 6$$

6. By filling more rows of the table, it is possible to make function g **odd**. If that were done, what would be the value of $g(-9)$?

If function g is odd, then

$$g(-9) = -1$$

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7. A function, f , is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g , is **odd** if $g(x) = -g(-x)$ for all x in the domain.

Let polynomial p be defined with the following equation:

$$p(x) = x^3 + x$$

- a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = (-x)^3 + (-x)$$

$$p(-x) = -x^3 - x$$

- b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -(-x^3 - x)$$

$$-p(-x) = x^3 + x$$

- c. Is polynomial p even, odd, or neither?

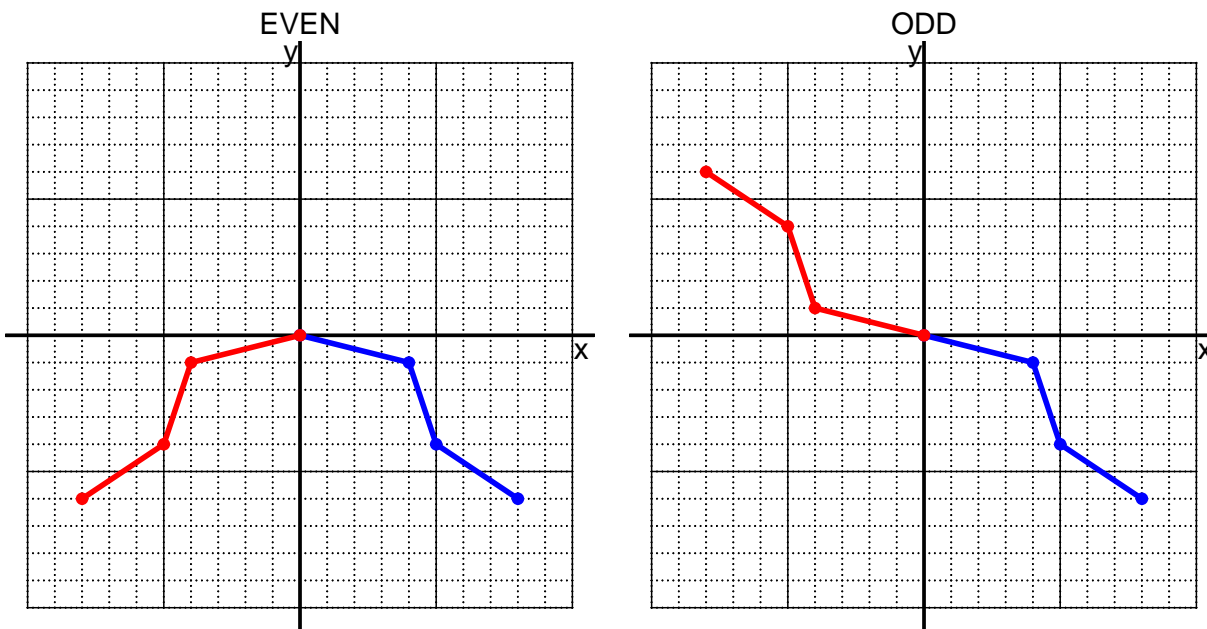
odd

- d. Explain how you know the answer to part c.

We see that $p(x) = -p(-x)$ for all x because $p(x)$ and $-p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an odd function.

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8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = 2(x + 8)$$

- a. Evaluate $f(31)$.

step 1: add 8
step 2: multiply by 2

$$\begin{aligned} f(31) &= 2((31) + 8) \\ f(31) &= 78 \end{aligned}$$

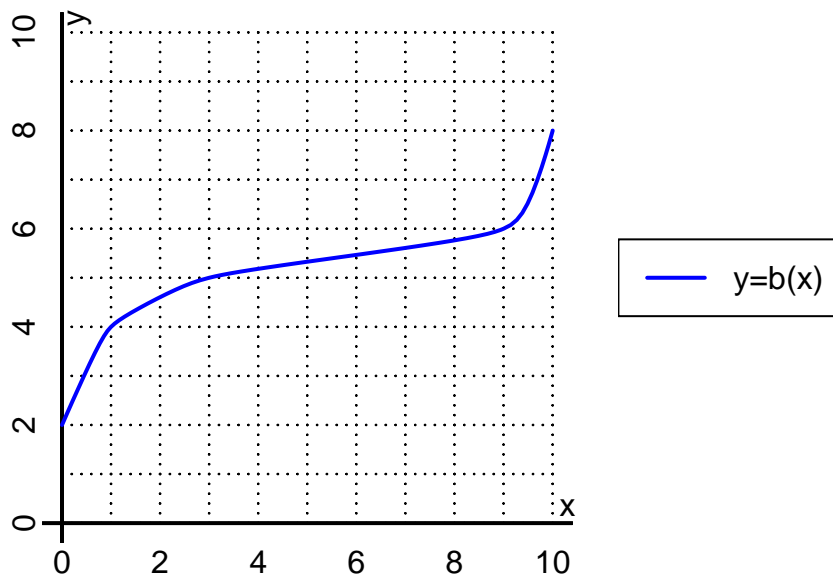
- b. Evaluate $f^{-1}(66)$.

step 1: divide by 2
step 2: subtract 8

$$\begin{aligned} f^{-1}(x) &= \frac{x}{2} - 8 \\ f^{-1}(66) &= \frac{(66)}{2} - 8 \\ f^{-1}(66) &= 25 \end{aligned}$$

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10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(3)$.

$$b(3) = 5$$

b. Evaluate $b^{-1}(4)$.

$$b^{-1}(4) = 1$$

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11. Function f is defined by the table below.

a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-5	5	-5	5
-1	-6	6	6	-6
0	0	0	0	0
1	6	-6	-6	6
2	-5	5	-5	5

b. Is function f even, odd, or neither?

neither

c. How do you know the answer to part b?

Function f is neither because neither column $-f(-x)$ nor column $f(-x)$ matches column $f(x)$ exactly.